

Claims

1. An optical fiber transmission system, comprising a terminal processing unit, an optical transmission unit, and a switch unit with the input and output thereof connected with the optical transmission unit, respectively, wherein

the terminal processing unit, connecting with UE, used for encapsulating and converting the signal of the UE to be transmitted into an optical signal and sending the optical signal to the optical transmission unit, as well as for de-encapsulating the signal from the optical transmission unit and sending the signal to the UE;

the optical transmission unit, connecting with the terminal processing unit and the switch unit respectively, used for multiplexing the encapsulated signal sent by the terminal processing unit and sending the multiplexed signal to the switch unit via an optical fiber; as well as for de-multiplexing the signal transmitted from the switch unit via an optical fiber and sending the de-multiplexed signal to the terminal processing unit;

the switch unit, connecting with the optical transmission unit, used for receiving the multiplexed signal from the optical transmission unit at the input side thereof, de-multiplexing the signal, determining the transmission destination of the signal according to the type of the signal and sending out the signal; and at the same time for multiplexing the signal that needs to be transmitted to the optical transmission unit at the output side thereof, converting the multiplexed signal to an optical signal and sending out the signal.

2. The optical fiber transmission system according to claim 1, wherein the terminal processing unit comprises a signal codec module, a terminal frame processing module, and a terminal electric/optical signal processing module, wherein

the signal codec module encodes various signals sent by UE and sends the encoded signals to the terminal frame processing module; at the same time, decodes the digital signal from the terminal frame processing module and sends the decoded signals to the UE;

the terminal frame processing module receives the digital signals sent by the signal codec module, encapsulates the signals before sending the encapsulated signals to the terminal electric/optical signal processing module; meanwhile, de-encapsulates the electric signals from the terminal electric/optical signal processing module before

sending the signals to the signal codec module; and

the terminal electric/optical signal processing module converts the optical signal from the optical transmission unit into an electric signal before sending the signal to the terminal frame processing module; meanwhile, converts the electric signal from the terminal frame processing module into an optical signal before sending the signal to the optical transmission unit.

3. The optical fiber transmission system according to claim 2, wherein the signal codec module comprises an encoder module and a decoder module;

the terminal frame processing module comprises a GFP (generic framing protocol) encapsulating module, a mapping module, a multiplexing module and a STM (synchronous transmission mode) framing module connected successively as well as a STM (synchronous transmission mode) de-framing module, a de-mapping module, a de-multiplexing module and a GFP (generic framing protocol) de-encapsulating module connected successively ; and

the terminal electric/optical signal processing module comprises a electric-to-optical conversion module and a optical-to-electric conversion module; wherein

the encoder module receives a signal from UE and encodes the signal before sending to the GFP encapsulating module; the electric-to-optical conversion module converts a frame from the STM framing module into an optical signal and sends the signal to the optical transmission unit;

the decoder module decodes an de-encapsulated signal from the GFP de-encapsulating module and sends the signal to the UE; the optical-to-electric conversion module converts the optical signal from the optical transmission unit into an electric signal and sends the converted signal to the STM (synchronous transmission mode) de-framing module.

4. The optical fiber transmission system according to claim 3, wherein the encoder module comprises a video encoder module, an audio encoder module, and a data encoder module; the GFP encapsulating module comprises a video GFP encapsulating module, an audio GFP encapsulating module, and a data GFP encapsulating module; the mapping module comprises a video mapping module, an audio mapping module, and a data mapping module; wherein the output of each kind

of encoder module connects with the corresponding GFP encapsulating module and corresponding mapping module successively, and the output of each kind of mapping module connects with the multiplexing module;

the decoder module comprises a video decoder module, an audio decoder module, and a data decoder module; the GFP de-encapsulating module comprises a video GFP de-encapsulating module, an audio GFP de-encapsulating module, and a data GFP de-encapsulating module; the de-mapping module comprises a video de-mapping module, an audio de-mapping module, and a data de-mapping module; wherein the output of each kind of de-mapping module connects with the corresponding GFP de-encapsulating module and corresponding decoder module successively, and input of each kind of de-mapping module connects with the de-multiplexing module.

5. The optical fiber transmission system according to claim 3, wherein the terminal processing unit further comprises a man-machine interface module, a control and management information processing module, and a terminal overhead processing module, wherein

the man-machine interface module receives the operation command from the UE and sends the command to the control and management information processing module; meanwhile receives the control and management message from the management information processing module and sends the information to the UE;

the control and management information processing module receives the operation command from the man-machine interface module, generates appropriate control and management messages and sends the messages to the terminal overhead processing module; meanwhile, receives control and management messages from the terminal overhead processing module, and interprets the messages before sending the messages to the man-machine interface module; and

the terminal overhead processing module receives the control and management messages from the control and management information processing module, generates appropriate frame overheads and sends the overheads to the terminal frame processing module; at the same time, receives the frame overheads from the terminal framing module, extracts the control and management information and then sends the information to the control and management information processing module.

6. The optical fiber transmission system according to claim 5, wherein the terminal overhead processing module comprises an overhead generation module and an overhead extraction module, wherein the input of the overhead generation module is connected with the control and management information processing module while the output thereof is connected with the STM framing module, and the input of the overhead extraction module is connected with the STM framing module while the output thereof is connected with the control and management information processing module.

7. The optical fiber transmission system according to claim 1, wherein the terminal processing module is an optical terminal;

or integrated video, audio and data processing terminal;

or an ONU (Optical network unit) or an ONT (Optical Network Terminal) based on an APON (ATM Passive Optical Network), an EPON (Ethernet Passive Optical Network) or a GPON (Gigabit-capable Passive Optical Network) or based on Ethernet.

8. The optical fiber transmission system according to claim 1, wherein the optical transmission unit comprises optical network units, optical allocation units, and optical line terminals, wherein

the optical network unit, connecting with the terminal processing unit, receives the signal from the terminal processing unit to be transmitted and sends the signal to the optical allocation unit; meanwhile, receives a signal from the optical allocation unit and sends the signal to the terminal processing unit;

the optical allocation unit, connecting between the optical network unit and optical line terminal, is used for converging the signals from the optical network units to be transmitted and sending the converged signal to one optical line terminal; meanwhile, for receiving the signal from the optical line terminal and distributing the signal to each of the optical network units;

the optical line terminal, connecting between the switch unit and the optical allocation unit, is used for interaction of signals between the optical allocation unit and the switch unit.

9. The optical fiber transmission system according to claim 1, wherein the optical transmission unit is based on PON (Passive Optical Network), CWDM (Coarse Wave Division multiplexing), DWDM (Dense Wave Division Multiplexing), UWDM (Ultra-dense Wave Division multiplexing) or direct optical fiber connection.

10. The optical fiber transmission system according to claim 1, wherein the switch unit comprises an adaptation module, a control module, a switching module, wherein

the adaptation module, connecting with the optical transmission unit, receives the signal from the optical transmission unit, makes rate/format processing of the signal and then sends the signal to the switching module and sends the control and management message in the signal to the control module; at the same time, makes rate/format processing of the signal from the switching module and then sends the processed signal to the optical transmission unit;

the control module receives the control and management message from the adaptation module, and carries out control and management of the switching process of the switching module based on the received message;

the switching module determines the destination of the signal from the adaptation module according to the control and management by the control module, and sends out the signal.

11. The optical fiber transmission system according to claim 10, wherein the adaptation module comprises an adaptation overhead processing module, an adaptation multiplexing/de-multiplexing module, an adaptation frame processing module, and an adaptation electric/optical signal processing module, wherein

the overhead processing module, after extracting the overhead sent by the frame processing module, sends the overhead to the control module; meanwhile, converts the control and management message that is generated by the control module according to an upstream adaptation module into overhead bytes, and then sends the overhead bytes to the frame processing module;

the multiplexing/de-multiplexing module receives the payload in the data sent from the frame processing module, de-multiplexes the payload into a code stream before sending it to the switching module; meanwhile, receives the code stream sent from an upstream adaptation module in the switch unit via the switching module, and

multiplexes the code stream before sending it to the frame processing module;

the frame processing module receives the overhead bytes from the overhead processing module as well as the multiplexed payload sent by the multiplexing/ de-multiplexing module, generates appropriate frames and sends the frames to the electric/optical signal processing module; meanwhile, decomposes the frames from the electric/optical signal processing module into overhead and payload and send the overhead and payload to the overhead processing module and the multiplexing/de-multiplexing module, respectively;

electric/optical signal processing module receives the frame from the frame processing module, converts the frame into optical signal and then sends the signal to the optical transmission unit; at the same time, receives the optical signal from the optical transmission unit, converts the signal into an electric signal and then sends the signal to the frame processing module.

12. The optical fiber transmission system according to claim 11, wherein the overhead processing module comprises an overhead extraction module and an overhead generation module; the multiplexing/de-multiplexing module comprises a multiplexing module and a de-multiplexing module; the frame processing module comprises a STM framing module and a STM de-framing module; the electric/optical signal processing module comprises an electric-to-optical conversion module and an optical-to-electric conversion module; wherein

the optical-to-electric conversion module converts the optical signal from the optical transmission unit into an electric signal and sends the signal to the STM de-framing module; the STM de-framing module separates the electric signal into overhead and payload , and sends the overhead to the overhead extraction module and sends the payload to the de-multiplexing module; the overhead extraction module extracts the overhead bytes and sends the overhead to the control module; the de-multiplexing module, under control of the control module, de-multiplexes the payload into a code stream and sends the code stream to the switching module;

the overhead generation module converts the control and management message from the control module according to an upstream adaptation module into an overhead, and then sends the overhead to the STM framing module; the multiplexing module receives the code stream from the upstream adaptation module in the switch

unit sent by the switching module, multiplexes the code stream and then sends the multiplexed code stream to the STM framing module; the STM framing module receives the overhead from the overhead generation module as well as the multiplexed code stream sent by the multiplexing module, generates appropriate frames and then sends the frames to the electric-to-optical conversion module; and the electric-to-optical conversion module connects with the optical transmission module.

13. The optical fiber transmission system according to claim 11, wherein the control module comprises an overhead interpreting module, a signaling and connection control module, a destination-port overhead processing module, wherein

the overhead interpreting module receives the overhead sent by the overhead processing module, interprets the overhead and then sends it to the signaling and connection control module;

the signaling and connection control module, after receiving the interpreted overhead sent by the overhead interpreting module, determines the appropriate control signaling which enters the switching module together with the output of the multiplexing/de-multiplexing module, and meanwhile, sends the interpreted overhead bytes to the destination-port overhead processing module;

the destination-port overhead processing module, after receiving the interpreted overhead sent by the signaling and connection management module, generates the overhead of the destination port, and then sends the overhead to the frame processing module in the downstream adaptation module.

14. The optical fiber transmission system according to claim 1, further comprising a gateway unit connecting between the switch unit and other networks for use in implementing protocol conversion between networks of different types.

15. The optical fiber transmission system according to claim 14, wherein the gateway unit comprises a signal processing module, a gateway codec module, a gateway overhead processing module, a gateway frame processing module, and a gateway electric/optical signal processing module; wherein

the signal processing module generates a signal needed by external networks using the signal from the gateway codec module and the control and management message from the gateway overhead processing module, and sends out the generated

signal; meanwhile, receives the signal from external networks, sends the service information in the signal to the gateway codec module and sends the control and management message in the signal to the gateway overhead processing module;

the gateway codec module receives and encodes the service information from the signal processing module, and then sends the encoded information to the gateway frame processing module; at the same time, receives and decodes the service information from the gateway frame processing module, and then sends the decoded information to the signal processing module;

the gateway overhead processing module receives the control and management message from the signal processing module, extracts the signaling and generates corresponding overhead before sending the overhead to the gateway frame processing module; meanwhile, receives an overhead from the gateway frame processing module, extracts overhead and generates corresponding signaling before sending the signaling to the signal processing module;

the gateway frame processing module, after receiving the service information from the gateway codec module and the overhead from the gateway overhead processing module, generates a corresponding frame and then sends the frame to the gateway electric/optical signal processing module; at the same time, decomposes the received frame sent by the gateway electric/optical signal processing module into a corresponding service information and overhead, and then sends the service information and overhead to the gateway codec module and gateway overhead processing module respectively;

the gateway electric/optical signal processing module converts the received frame sent by the gateway frame processing module into an optical signal, and then sends the signal to the optical transmission unit; at the same time, converts the received optical signal sent by the optical transmission unit into an electric signal, and then sends the signal to the gateway frame processing module.

16. The optical fiber transmission system according to claim 15, wherein the signal processing module comprises a signal analyzer and a signal generator; the gateway codec module comprises an encoder module and a decoder module; the gateway overhead processing module comprises an extraction module, a generation module, a gateway overhead generation module, and a gateway overhead extraction

module; the gateway frame processing module comprises a GFP encapsulating module, a mapping module, a multiplexing module, a STM framing module, a GFP de-encapsulating module, a de-mapping module, a de-multiplexing module, and a STM de-framing module; and the gateway electric/optical signal processing module comprises a gateway electric-to-optical conversion module and a gateway optical-to-electric conversion module; wherein

the signal analyzer sends the service information in the signal from the external network to the encoder module and sends the control and management message in the signal to the extraction module; the encoder module, the GFP encapsulating module, the mapping module, and the multiplexing module are connected in order; the extraction module is connected with the overhead generation module; the STM framing module receives the service information from the multiplexing module and the overhead from the overhead generation module, generates a corresponding frame and then sends the frame to the electric-to-optical conversion module; the electric-to-optical conversion module converts the frame from the STM framing module into an optical signal, and then sends the signal to the optical transmission unit;

the optical-to-electric conversion module converts the received optical signal sent by the optical transmission unit into an electric signal, and then sends the signal to the STM de-framing module; the STM de-framing module decomposes the frame from the optical-to-electric conversion module into corresponding service information and overhead, and then sends the information and overhead to the de-multiplexing module and the overhead extraction module, respectively; the de-multiplexing module, the de-mapping module, the GFP de-encapsulating module, and a decoder module are connected in order; the overhead extraction module is connected with the generation module; the signal generator generates a signal needed by the external network according to the service information from the decoder module and the control and management message from the generation module before sending out the signal.

17. The optical fiber transmission system according to claim 16, wherein,

when the network connected with the gateway unit is a traditional PSTN (Public Switched telephony network), the signal analyzer is a voice signal analyzer and the signal generator is a voice signal generator;

when the network connected with the gateway unit is a traditional data network,

the signal analyzer is a data signal analyzer and the signal generator is a data signal generator.

18. The optical fiber transmission system according to claim 14, wherein the network connected with the gateway unit is a traditional television network, and the gateway unit comprises a SDTV (Standard Definition TV) signal generator, a generation module for generating signaling as well as control and management information, an overhead extraction module, a video decoder module, an audio decoder module, a data decoder module, a video GFP de-encapsulating module, an audio GFP de-encapsulating module, a data GFP de-encapsulating module, a video de-mapping module, an audio de-mapping module, a data de-mapping module, a de-multiplexing module, a STM de-framing module and an optical-to-electric conversion module, wherein

the optical-to-electric conversion module converts the received optical signal sent by the optical transmission unit into an electric signal, and then sends the electric signal to the STM de-framing module; the STM de-framing module decomposes the frame from the optical-to-electric conversion module into corresponding data information and overhead, and then sends the data information and the overhead to the de-multiplexing module and the overhead extraction module, respectively; the de-multiplexing module is connected with input of the video de-mapping module, the audio de-mapping module, and the data de-mapping module respectively; output of each kind of de-mapping module is connected with the corresponding GFP de-encapsulating module and decoder module in order, respectively; the overhead extraction module is connected with the generation module for generating signaling, control and management information; and the SDTV signal generator generates the signal needed by the external network according to the service information from each kind of decoder module and the control and management message from the generation module for generating signaling, control and management information.

19. The optical fiber transmission system according to claim 14, wherein the gateway unit can be embedded in the switch unit.

20. An optical fiber transmission method, comprising a transmitting process from UE to a remote end and a receiving process from a remote end to UE, wherein

the transmitting process comprises:

A, a terminal processing unit encapsulating the signal from the UE and then sending to an optical transmission unit;

B, the optical transmission unit multiplexing the encapsulated signal and then sending the signal to a switch unit via optical fiber;

C, the switch unit converting the multiplexed signal into an electric signal and de-multiplexing the signal, determining the destination optical transmission unit of the de-multiplexed signal according to the type of the signal and sending the signal;

the receiving process comprises:

D, the switch unit multiplexing the signal to be sent to the optical transmission unit, converting the multiplexed signal to an optical signal and then sending the signal to the destination optical transmission unit via optical fiber;

E the optical transmission unit de-multiplexing the optical signal from the switch unit, and then sending the signal to the terminal processing unit;

F, the terminal processing unit converting the optical signal from the optical transmission unit into an electric signal, de-encapsulating the electric signal based on the type of the signal, and then sending the signal to the UE.

21. The optical fiber transmission method according to claim 20, wherein Step A further comprises:

A1, determining the situation of the signal from UE;

A2, defining necessary bandwidth resources or calling the default bandwidth resource of the system, and at the same time determining the size of switching granularity adopted in the switch unit;

in step A, the step of encapsulating the signal from UE comprises: successively encoding, encapsulating, mapping, multiplexing the service signal from UE, then framing the multiplexed signal and the overhead from the UE generated by a control and management module, and sending the framed signal to the optical transmission unit through the defined or called bandwidth resource ;

in step F, the step of de-encapsulating the electric signal based on the type of the signal comprises: de-framing the electric signal to obtain an overhead and a payload, extracting the overhead bytes, then generating a control and management message, and sending the information to the UE; successively de-multiplexing, de-mapping, de-

encapsulating, and decoding the payload and then sending the result to the UE.

22. The optical fiber transmission method according to claim 21, wherein the signal from UE comprises video signal, audio signal, and data signal,

the step of encoding, encapsulating, mapping, multiplexing the service signal from the UE further comprises: encoding, encapsulating and mapping each kind of signal, respectively and then multiplexing each kind of mapped signal together;

the step of de-multiplexing, de-mapping, de-encapsulating, and decoding the payload further comprises: de-multiplexing the payload to generate video signal, audio signal, and data signal, and de-mapping, de-encapsulating, and decoding each kind of signal, respectively.

23. The optical fiber transmission method according to claim 20, wherein the step B further comprises

B1, assigning a time slot to each optical network unit, respectively, the optical network unit multiplexing the encapsulated signal to the assigned time slot, and then sending the time slot to an optical allocation unit;

B2, the optical allocation unit converging the signals sent from each optical network unit, and then sending the converged signal to an optical line terminal;

B3, sending the converged signal to the switch unit through an optical fiber interface provided by the optical line terminal;

the step E further comprises,

E1, sending the signal through the optical fiber interface of the optical line terminal to the optical allocation unit;

E2, the optical allocation unit duplicating the signal from the optical line terminal into several unified signals, and then sending them to each optical network unit, respectively;

E3, the optical network unit sending the signal to the terminal processing unit.

24. The optical fiber transmission method according to claim 20, wherein, in step C, the step of multiplexing, determining the destination optical transmission unit for transmitting the multiplexed signal and sending further comprises:

De-framing the converted electric signal into an overhead and a payload, extracting the overhead bytes from the overhead, interpreting the overhead bytes,

and generating a control and management message; at the same time, de-multiplexing the payload to a code stream, and sending the code stream to the destination optical transmission unit according to the control and management message;

in step D, the step of multiplexing the signal to be sent to the optical transmission unit, converting the multiplexed signal into an optical signal and then sending the signal to the destination optical transmission unit via optical fiber further comprises: converting the control and management message from the upstream into an overhead, multiplexing the code stream of the signal from the upstream, and framing the code stream and the overhead.

25. The optical fiber transmission method according to claim 20, further comprising:

when receiving a signal from a traditional PSTN or a data network,

H, a gateway unit analyzing and processing the signal from the network and decomposing the signal into the service signal and the control and management message, encapsulating the payload generated from the service signal and the overhead extracted and generated from the control and management message, then converting the encapsulated signal into an optical signal, and sending the signal to the optical transmission unit;

when sending a signal to a traditional PSTN or a data network,

I, the gateway unit converting the optical signal from the optical transmission unit into an electric signal, de-encapsulating the electric signal into the payload and the overhead, generating the signal needed by the network from the payload based on the control and management message extracted and generated from the overhead and sending the signal to the network.

26. The optical fiber transmission method according to claim 25, wherein the step of encapsulating further comprises successively encoding, encapsulating, mapping and multiplexing the service signal, and then framing the multiplexed payload and the overhead extracted and generated from the control and management message;

the step of de-encapsulating further comprises: de-framing the converted electric signal into the payload and the overhead; generating the control and

management message from the overhead; at the same time, successively de-multiplexing, de-mapping, de-encapsulating, and decoding the payload .

27. The optical fiber transmission method according to claim 20, further comprising:

when transmitting a signal to a traditional television network,

the gateway unit converting the optical signal from the optical transmission unit into an electric signal, de-framing the converted electric signal into the payload and the overhead; generating the control and management message from the overhead; at the same time, de-multiplexing the payload into a video payload , an audio payload , and a data payload, and then successively de-mapping, de-encapsulating, and decoding each kind of de-multiplexed payload, generating the signal needed by the network from the payload and sending the signal to the traditional television network based on the control and management message extracted and generated from the overhead.

28. A terminal processing unit for use in an optical fiber transmission system, comprising a signal codec module, a terminal frame processing module, and a terminal electric/optical signal processing module, wherein

the signal codec module encodes various signals sent by UE and sends the digital signals to the terminal frame processing module; at the same time, decodes the digital signals sent by the terminal frame processing module and sends the decoded signals to the UE;

the terminal frame processing module receives the digital signals sent by the signal codec module, encapsulates the signals and sends the encapsulated signals to the terminal electric/optical signal processing module; meanwhile, de-encapsulates the electric signal sent by the terminal electric/optical signal processing module and then sends the signal to the signal codec module;

the terminal electric/optical signal processing module converts the optical signal sent by an optical transmission unit into an electric signal and sends the electric signal to the terminal frame processing module; meanwhile, converts the electric signal sent by the terminal frame processing module into an optical signal and sends the optical signal to the optical transmission unit.

29. The terminal processing unit according to claim 28, wherein the signal codec module comprises an encoder module and a decoder module;

the terminal frame processing module comprises a GFP (generic framing protocol) encapsulating module, a mapping module, a multiplexing module and a STM (synchronous transmission mode) framing module connected successively in order; and an STM (synchronous transmission mode) de-framing module, a de-mapping module, a de-multiplexing module and a GFP (generic framing protocol) de-encapsulating module connected successively in order ;

the terminal electric/optical signal processing module comprises a electric-to-optical conversion module and a optical-to-electric conversion module; wherein

the encoder module receives a signal from UE, encodes the signal and sends the encoded signal to the GFP encapsulating module; the electric-to-optical conversion module converts the frame sent by the STM framing module into an optical signal and sends the optical signal to the optical transmission unit;

the decoder module decodes an de-encapsulated signal sent by the GFP de-encapsulating module and sends the decoded signal to the UE; the optical-to-electric conversion module converts the optical signal sent by the optical transmission unit into an electric signal and sends the electric signal to the STM (synchronous transmission mode) de-framing module.

30. The terminal processing unit according to claim 29, wherein the encoder module comprises a video encoder module, an audio encoder module, and a data encoder module; the GFP encapsulating module comprises a video GFP encapsulating module, an audio GFP encapsulating module, and a data GFP encapsulating module; the mapping module comprises a video mapping module, an audio mapping module, and a data mapping module; the output for each kind of encoder module connects with the corresponding GFP encapsulating module and mapping module in order, and the output of each kind of mapping module connects with the multiplexing module;

the decoder module comprises a video decoder module, an audio decoder module, and a data decoder module; the GFP de-encapsulating module comprises a video GFP de-encapsulating module, an audio GFP de-encapsulating module, and a data GFP de-encapsulating module; the de-mapping module comprises a video de-mapping module, an audio de-mapping module, and a data de-mapping module; the output of

each kind of de-mapping module connects with the corresponding GFP de-encapsulating module and decoder module in order, and the input of each kind of de-mapping module connects with the de-multiplexing module.

31. The terminal processing unit according to claim 28, wherein the terminal processing unit further comprises a man-machine interface module, a control and management information processing module, and a terminal overhead processing module, wherein

the man-machine interface module forwards the operation command sent by the UE to the control and management information processing module; meanwhile, receives and forwards the control and management message from the management information processing module to the UE;

the control and management information processing module, after receiving the operation command sent by the man-machine interface module, generates a corresponding control and management message and sends the message to the terminal overhead processing module; meanwhile, receives the control and management message sent by the terminal overhead processing module, interprets the message and then sends the interpreted message to the man-machine interface module;

the terminal overhead processing module receives the control and management message from the control and management information processing module, generates a corresponding overhead and sends the overhead to the terminal frame processing module; at the same time, extracts the control and management message and then sends the message to the management information processing module.

32. The terminal processing unit according to claim 31, wherein the terminal overhead processing module comprises an overhead generation module and an overhead extraction module; the input of the overhead generation module is connected with the control and management information processing module, the output of the overhead generation module is connected with the STM framing module; the input of the overhead extraction module is connected with the STM framing module, and the output of the overhead extraction module is connected with the control and management information processing module.